

# Notice of Allowability

Application No.

10/028,357

Examiner

Juan A. Torres

Applicant(s)

DENNO, SATOSHI

Art Unit

2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment - After Non-Final Rejection on 05/31/2005.
2. ☒ The allowed claim(s) is/are 1-16.
3. ☒ The drawings filed on 31 May 2005 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

- |   |   |
|---|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)                       |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                               |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance              |
|   | 9. <input type="checkbox"/> Other _____.  |

### EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Bradley Lytle on June 13, 2005.

The application has been amended as follows:

Claims 1-8 are amended as follows:

1. (Currently Amended) A receiving method in a receiver demodulating K user signals in a plurality of user signals transmitted on the same communication channel, said receiving method comprising the steps of:

extracting  $i$ th to Kth user signals;

calculating a joint probability density function that any signal set in said  $i$ th to Kth user signals will be obtained when  $i$ th to Kth user signals estimated are assumed to be received;

multiplying probability density functions calculated in said calculating joint probability density function step so that a multiplied value is obtained; and

estimating first to Kth user signals which maximize said multiplied value, and outputting said first to Kth user signals.

2. (Currently Amended) The receiving method as claimed in claim 1, said receiving method further comprising the steps of:

determining which user signals should be extracted according to variation of communication channel state such that said probability density functions obtained by said joint probability calculation become maximum; and

extracting user signals determined by said user estimation.

3. (Currently Amended) The receiving method as claimed in claim 1, said receiving method further comprising the steps of:

determining weight parameters on the basis of received signals and  $i$ th to  $K$ th user signals estimated according to variation of communication channel state; and  
assigning weights to said received signals by using said weight parameters.

4. The receiving method as claimed in claim 1, said receiving method further comprising the steps of:

determining weight parameters on the basis of received signals according to variation of communication channel state, and

assigning weights to received signals by using the weight parameters determined.

5. (Currently Amended) A receiving method in a receiver demodulating  $K$  user signals in a plurality of user signals transmitted on the same communication channel, said receiving method comprising the steps of:

extracting  $i$ th to  $K$ th user signals;

calculating a logarithm of a joint probability density function that any signal set in said  $i$ th to  $K$ th user signals will be obtained when  $i$ th to  $K$ th user signals estimated are assumed to be received;

adding logarithms calculated by said log likelihood calculation so that an added value is obtained; and

estimating first to Kth user signals which maximize said added value, and outputting said first to Kth user signals.

6. (Currently Amended) The receiving method as claimed in claim 5, said receiving method further comprising the steps of:

determining which user signals should be extracted according to variation of communication channel state such that said logarithms obtained become maximum; and

extracting the determined user signals.

7. (Currently Amended) The receiving method as claimed in claim 5, said receiving method further comprising the steps of:

determining weight parameters on the basis of received signals and ith to Kth user signals estimated according to variation of communication channel state; and assigning weights to said received signals by using said weight parameters.

8. (Currently Amended) The receiving method as claimed in claim 5, said receiving method further comprising the steps of:

determining weight parameters on the basis of received signals according to variation of communication channel state; and

assigning weights to received signals by using the calculated weight parameters.

#### **EXAMINER'S STATEMENT FOR REASONS FOR ALLOWANCE**

The following is an examiner's statement of reasons for allowance: claims 1-16 are allowed because the references cited fail to teach, as applicant has, a method and apparatus for calculating a joint probability density function that any signal set in the  $i^{\text{th}}$  to  $K^{\text{th}}$  user signals will be obtained if  $i^{\text{th}}$  to  $K^{\text{th}}$  user signals, multiplying probability density functions and estimating first to  $K^{\text{th}}$  user signals which maximize the multiplied value; and calculating a logarithm of a joint probability density function that any signal set in the  $i^{\text{th}}$  to  $K^{\text{th}}$  user and adding logarithms so that maximize the added value, and outputting the first to  $K^{\text{th}}$  user signals to the log likelihood calculation, as the applicant has claimed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Schmidl (US 6725025) discloses methods of canceling interference among wireless units communicating with the same base station. Chang (US 5712871) discloses a method and apparatus for implementing a direct-sequence code division multiple access communication system with an M-ary pulse-position modulated spreading-sequence signal. Shima (US Patent Publication 20020154717) discloses weighting factor setting method for subtractive interference canceller, interference canceller unit using said weighting factor and interference canceller

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is (571) 272-3119. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Juan Alberto Torres  
06-13-2005

  
**MOHAMMED GHAYOUR**  
**SUPERVISORY PATENT EXAMINER**